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DEMODEX FOLLICULORUM IN DISEASED CONDITIONS OF THE HUMAN FACE.

Geo. E. Fell, M. D., F. R. M. S., Buffalo, N. Y.

At the last* meeting of the New York State Medical Association, held in New York City, I read a paper entitled "Some Etiological Factors in the Acneform Diseases," in which the *Demodex folliculorum* was presented as a probable factor in the pustular diseases so generally prevalent. While much has been written about the parasite mentioned, the presence of it in unusual conditions and also in great numbers I thought might be of general interest, and, furthermore, on observation I believe there is ground for a deeper investigation into the habits of this mite, to clear up the detail of its origin and life history. This I have not as yet been enabled to do, finding it a difficult task even under favorable conditions of observation.

Duhring,† regarding *Demodex folliculorum*, says: "This minute creature (also designated steatozöon, etc.) inhabits the sebaceous follicles of healthy normal skin, and consequently gives rise to no symptoms whatever of disease. According to Meguin, it forms the only genus of a family of demodicides. A single species only occurs upon man, those found upon the dog, cat, sheep, and other animals being distinct, and not transferable to the skin of man." It is microscopic, varying in length from one-twelfth (.1763 mm.) to one-sixth (.3526 mm.), and has an elongated, rounded, worm-like form, made up of a head, thorax, and a long abdomen. Other shorter forms are also found. From the thorax come off eight stout, short, conical legs, all of the same size. The larva has only six‡ legs. The abdomen is usually from two to three times the length of the thorax, and tapers off to a rounded point.

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* November, 1885.
† "Diseases of the Skin," 2d edition, 1881, p. 612.
‡ Questioned.

The parasite exists in the sebaceous glands of the skin, in both sexes, especially about the face, nose, ears, back, and chest, and lives on sebaceous matter. Two, three, or more of them often exist in one follicle. It is said not to occur in infants. It is entirely inoffensive, and is met with in healthy skin quite as often as in those cases in which the sebaceous glandular system is markedly disturbed, as for example, in acne or comedo. All persons, however, do not seem to give quarters to the creature; thick, greasy skins, more than thin, dry skins, afford a nidus. Individual specimens may be found as often, at least, as two or three times in ten persons.

No difficulty is experienced in obtaining the parasite in question from a likely subject. A prominent or patulous follicle or comedo upon the nose or forehead may be squeezed out, and the contents placed on a glass slide with a drop of olive oil, and covered with a thin glass, when, with a power of from one to three hundred diameters, one or more of them will be usually found."

Professor James C. White,* regarding the *Demodex folliculorum*, says: "This minute mite, which inhabits the hair follicles, needs only a mere mention, as it gives rise to no phenomena, is of frequent occurrence upon healthy skins, and requires no treatment."

Ziegler† says, regarding the same mite: "There is a third mite, which is found solitary or in small numbers in the sebaceous matter of the follicles in perfectly healthy skin. The head bears a proboscis and a pair of short antennæ. It has no pathological significance."

Erasmus Wilson‡ says, in speaking of comedo: "And, when the follicular matter is abundant and rich in oil and albumen, we may discover another object in the midst of the mass, a living animal, the *Steatozöon folliculorum*. As many as ten or twelve of these creatures are sometimes met with, feeding on the contents of the follicle, and they may be seen in every stage of development—ova, spade-shaped embryos, and perfect animals * * * these follicular entozoa give rise to no irritation of the follicle, nor are they the cause of disease; on the contrary, they aid the restoration of the skin to health by disintegrating the accumulated mass (hair, etc.), and thus facilitating its expulsion."

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* "International Encyclopædia of Surgery," 1885, p. 666.
† "A Text-Book of Pathological Anatomy," 1884, p. 331.
‡ "Cutaneous Medicine and Diseases," p. 204.

Now, as I propose to say something about the various methods of treatment of pustular diseases, as urged by high authorities, I may say that anything pertaining to histology and pathology, where factors microscopic may be under consideration, are, in my opinion, entirely proper as subjects for consideration in this, a Society organized for the advancement of microscopical research.

Wilson's local treatment of acne is composed of hypochloride of sulphur ointment and bichloride of mercury in spirits of wine, or in an emulsion of bitter almonds in proportion of one to two grains to the ounce. This may be dabbed on night and morning after ablution with soap. If the parasites are an important factor in the disease, this treatment would, undoubtedly, soon exterminate them or modify their development.

The quotations given indicate the general view regarding the value of the *Demodex folliculorum* in diseased conditions; *i. e.*, they are considered by the highest authorities (others besides those quoted) entirely insignificant as pathogenic factors. From these and other statements it is seen that in suggesting the thought that these minute forms of life are etiological factors in even some of the phases of acneform diseases, I shall be but little in accord with the highest authorities. In antagonism to these views, I may say that the results of my observations appear to indicate a close relationship of the parasites with the diseased condition. Their almost constant appearance in the newly-formed pustules (in the free pus frequently), and their presence in those of the indurated variety when quite deep seated, cannot be urged, in any just sense, with our knowledge of the effect of foreign bodies in the tissues, as of no pathological import. It might as well be assumed that the *Acarus scabiei*, the now well-known itch mite, is of no significance in the tissues. And then, again, it is quite reasonable to contend that the unnatural growths of the hair, frequently found in the pustules of the human face, and which, when they act as foreign bodies, undoubtedly produce inflammatory action, are not so serious pathological factors as these little creatures, which have the power of moving about in the tissues. If we accept the view that the minute bacterial forms of life are productive of disease, even through the formation of ptomäines, it is as readily assumed that the parasites referred to in these pages might be pathogenic factors.

I may propound this question: Why is it that no really satisfactory constitutional treatment—frequently constitutional treatment does prevail—has been discovered for some of the forms of acne? In some of my female patients the digestive tract appeared to be in perfect function and menstruation normal; as far as objective symptoms were concerned no diseased condition prevailed except this inveterate and hideous acneform eruption which is usually confined to the face. The depressing effect on the mind of the patients produced by the steadily lasting eruption, kept up by the thought that the disease was incurable, and thought upon by others as possibly venereal, has frequently been noticeable. I fully believe that patients with this disease suffer, in mind, at least, as greatly as those afflicted with the most serious maladies, not even excepting smallpox. I have known patients to lock themselves from the gaze of the world for months, to forego all society pleasures, to become, as treatment after treatment failed, as physician after physician gave up the case, utterly despondent of ever becoming rid of their tormenting malady. And can this be considered remarkable in the unsatisfactory light with which the best physicians generally view the case?

I can not give a better illustration of the truth of this statement than to quote some remarks from an article on acne.* "Acne is an inflammatory, usually chronic, disease of the sebaceous glands," giving the characteristics so well known and detailed in most of the works on this subject. Its causes are "numerous and varied," as, for instance, "character of the skin—persons with thick, oily skins are most apt to suffer—and in pale, anæmic individuals with dry, rather harsh skins; puberty, scrofula and cachexia or general debility, anæmia and chlorosis, habitual derangement of the alimentary canal, dyspepsia, disorders of menstruation, a fresh outbreak may be expected before, during, or just after each menstrual period," and so on. These are a few only of the causes assigned for this apparently specific, *usually* localized disease.

As to the treatment, that of a constitutional nature covers a wonderfully wide range of therapy; wherever we look we find this to be the case. Continuing our quotations from the article referred to above, as being one of the latest and most reliable on the subject, we find that Dr. Van Harlingen, the author of the paper, says: "The local treatment of acne is of great importance, especially with regard to the choice of remedies," among which he mentions that "ung. hydrarg. precip. alb."; "sulphur and its preparations are among the most valuable remedies in our possession for treatment of acne in most of its forms." He also states that "indurated and pustular acne may be sometimes benefited by the application to each lesion of a drop of solution of the acid nitrate of mercury on a sharpened match, followed by bathing with hot water."

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* Wood's "Reference Hand-Book of the Medical Sciences," 1st vol., 1885.

The case in which my attention was given to the contents of the pustules had been under observation for some time, during a good portion of which no treatment was prescribed. The first course of treatment produced an active inflammatory condition of the skin, which, however, was only sufficient to abate the severity of the case for a time. Similar treatment in one other case where parasites were subsequently found was eminently satisfactory, the disease not returning for several years, and then was quickly amenable to the same treatment.

Results of Examination of the Contents of the Pustules.—Miss L. Health ordinarily good, menstruation regular, at one time troubled with dyspepsia. Had been treated locally and constitutionally by several of our best known physicians without any real satisfactory results. The case first referred to in the preceding paragraph.

September 19, 1885.—After making an incision a small drop of pus was removed to a slide, a cover-glass placed over it, and examined with a four-tenths-inch objective. The first parasites were found October 19. Only two were seen on the slide prepared. The question was propounded: Have they anything to do with the disease, or are they, as is generally stated and supposed, merely an accidental accompaniment of it? The continued observations which I detail in the following pages I believe shows much more than an accidental accompaniment.

September 21.—On the first slide examined, nine of the parasites were observed, several within the field of the objective at one time. They were of various sizes, some had what I took to be eggs within their bodies. Four additional slides were prepared, and from two to four parasites were found on each. One slide which was made up principally of blood had none on it.

September 23.—Seven or eight slides prepared. One had seven or eight parasites, others five or six, and some only two or three on them.

September 28.—Four slides prepared. The parasites found on all four.

September 30.—Eight slides were prepared, seven from new pustules which had appeared since last treatment, and one from a highly inflamed portion of the face. The *Demodex folliculorum* found on all but that taken from the highly irritated portion of the face.

October 2.—I prepared thirty-three slides at one treatment, many from small pustules not before interfered with. Each slide contained either a portion or the entire amount of pus obtained from each pustule. The results of observations of the slides were as folfows: In nine the parasites were not found (but may have been overlooked). Blood was plentiful in most of these. In one, almost all blood, none were found. In ten, several, or one to three or more found. In thirteen they were plentiful, some slides having from eight to twelve parasites. It is generally noted that the pus coming from the newly formed pustules, which come out in a somewhat indurated mass, most frequently contains the parasites, frequently free from the induration, whereas those from the pustules which have been treated some time have but few of these forms present.

October 5.—Fourteen or fifteen slides were prepared, and mites examined in glycerine. They were found to be alive. In the great majority of cases two of them were together, often in a small oil globule, but quite as frequently free in the mass of pus corpuscles. A precaution to be observed, if it is desired to preserve the mites, is to mount them in a small cell to prevent them from being crushed as the cover-glass approximates the slide.

The treatment, continued three times weekly, resulted in finding the parasites wherever new pustules had formed.

NOTE.—Sometimes, before any indication of a pustule is appreciated by the patient, on carefully passing the finger over the face, slight indurated points may be felt. On being incised, and the contents squeezed out by the fingers or the bistoury, the parasites are almost invariably found to be present. In cases where the indurations have required an incision of fully one-half inch in depth the result has been similar.

October 23.—Sixteen slides were prepared, in which the parasites were almost invariably found in numbers of from one to seven to each pustule.

October 28.—My notes read as follows: Slides Nos. 1, 2, 3, contain four or five acari. No. 4, made from a large pustule from which the pus had been previously removed, contained but one form. Slides 5, 6, 7, 8 give similar results.

At this time, November 17, many parts of the face free from the pustules, and the skin has assumed a healthy although reddened appearance. The examinations of the contents of the pustules as they newly appeared have resulted in the finding of the parasites as before in the pus removed from them.

With local and also constitutional treatment this case was subsequently greatly improved, although at the present time appear indications of the formation of slight pustules.

A Miss H—— was cured of the form known as "acne indurata," and before the presence of the parasite was thought to be associated with the eruption. From similarity of objective symptoms I have reasons to believe that parasites would have been found if contents of pustules had been examined with the microscope.

Now comes an interesting feature. The case of Mrs. J. H. S., treated successfully in March, 1882, I was informed this month had broken out slightly again, and that the lady was using the treatment which had been before successful in her case. I repaired to her residence, obtained permission to puncture the *only* pustule left, which measured not more than $\frac{1}{100}$ of an inch in diameter after being removed from the face, and on my return home, examination of this portion of pus revealed one of the parasites in active condition.

This occasional return of the pustules in decreased number, for the sake of argument, might be ascribed to the continued propagation of the organisms, the ova remaining in a dormant condition, or their development being interfered with for a time. I am unaware as to the time of development of the demodeces; for even had the problem been worked out there might be many conditions which would retard their growth and make the period of freedom from the eruption variable in different cases. Again, in many instances the mites were found deep in the tissues, as, where indurations were incised, the pus removed was also found to contain them. The time required to carry this irritation to the surface of the skin might give another possible variable quantity in the question.

It is stated on good authority that a pustular disease is produced in the hog by a mite resembling closely the *D. folliculorum*, *viz.*, the *D. phylloides*. When opportunity offers I will examine and compare the two forms.

It therefore appears to me that, notwithstanding the general prevalence of the *D. folliculorum* in the so-called normal tissue of the face, neck, nose, etc., their presence in *extraordinary* numbers may be productive of pathological changes in some varieties of these diseases.

I may say in closing that my notes were much more fully detailed than the paper might indicate, as in almost every treatment the microscope was brought into use. I regret that a greater number of cases have not been worked out in this manner; and, if opportunity offers, I propose to continue the observations until I have reason to be more fully satisfied.